

The Citizen Lake Awareness and Monitoring 2001 Annual Summary of Results

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Indian Lake, Summer 2001

Introduction

The 2001 season was a successful year for the **CLAM** program. Seven additional lakes were monitored than in the 2000 season. Sixty-nine volunteers submitted data for 38 Ohio lakes. Twelve of these volunteers were new to the **CLAM** program. These data were collected from May to October by trained volunteers. These data allow us to predict the productivity of the participating lakes.

Methods

The **CLAM** lake monitors measured water transparency in inches using a Secchi disk. These data were used to generate a ranking of lakes according to their average 2001 Secchi depths.

Trends in water clarity, presented as a positive or negative percent change per year, over time was evaluated using a linear regression analysis. Lakes with a statistically significant amount of annual change in transparency were identified. Only lakes with five years or more of data were included in this calculation.

An evaluation of water color using a Custer Color Strip was also performed by the **CLAM** participants. These data are reported as a number, 1 through 11, corresponding to a color hue involving greens and browns.

To provide an overall view of lake conditions, the other parameters observed by **CLAM** volunteers

included: air and water temperature, cloud cover, rainfall, lake depth at sampling site, water level, perceived turbidity and possible reasons, lake management practices, perceptions about water quality, aesthetics, and lake impairment, and an estimate on the amount of lake use. This information is presented individually for each **CLAM** monitored lake in 2001 on the Lake Summary Reports.

Summary of Results

A list of the lakes that participated in the **CLAM** program in 2001 are listed in Fig. 1. Included are the average transparencies and water colors for the 2001 sampling season. For the second year in a row, Lake Buckhorn (Holmes County) had the most average transparency at 92.49 inches. Those lakes with 60 inches or greater transparency were Fisherman's Pond, Cinnamon Lake, Lake Erie and Lake Buckhorn.

Crystal Lake had the least average transparency at 8.00 inches.

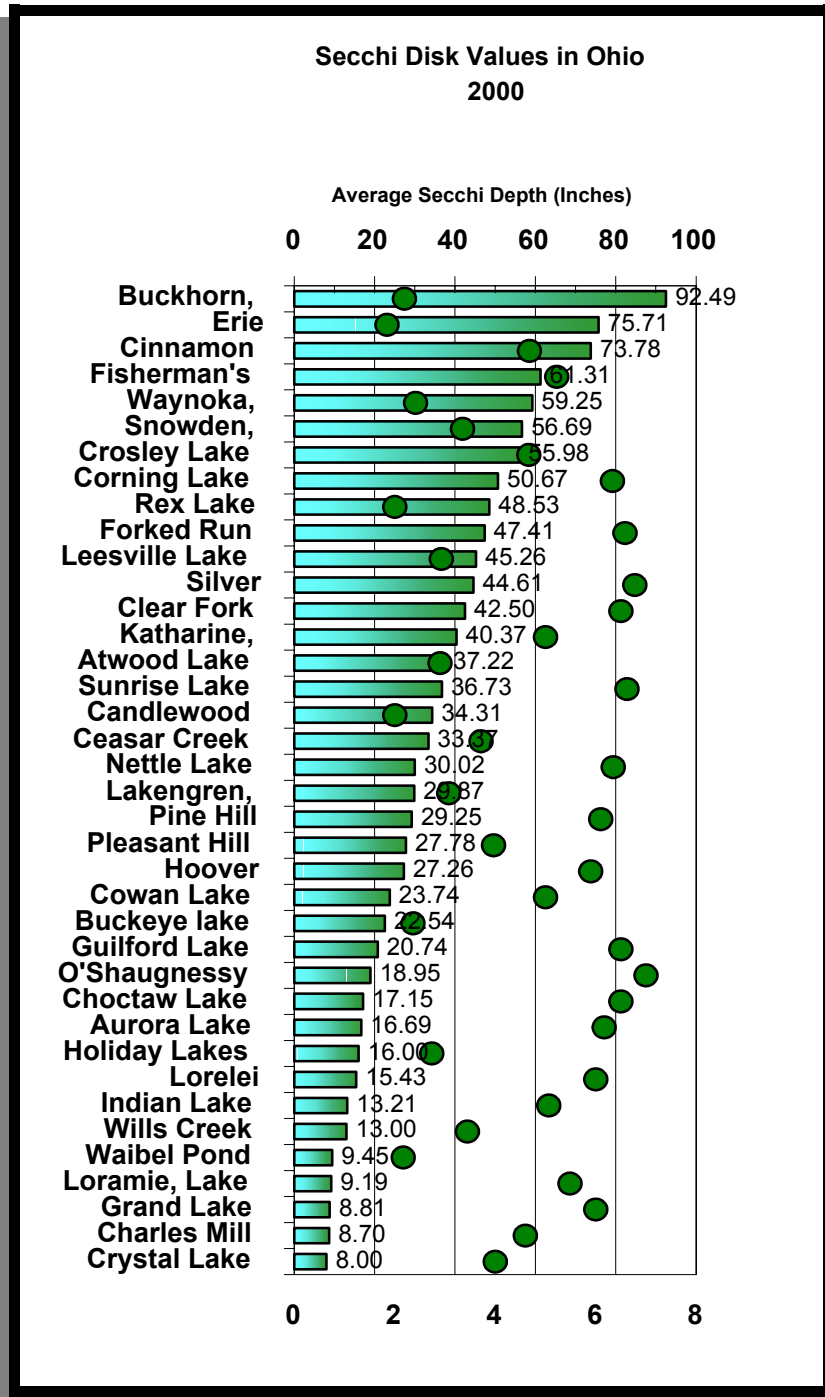


Fig. 1
Thirty-eight lakes with average Secchi disk values, recorded in inches, and average water color values (Custer color chart, below).



There were five lakes with less than one foot of transparency; Waibel Pond, Lake Loramie, Grand Lake St. Mary's, Charles Mill Lake, and Crystal Lake.

Seven of the 38 lakes monitored had average transparency readings between 12 and 20 inches. Twenty-two of these lakes averaged between 20 and 60 inches of transparency. Waynoka Lake, Lake Snowden, Crosley Lake, and Corning Lake all had relatively high transparency with readings within the 50 inch range. Several lakes had five or fewer data points to calculate the average transparency values. These lakes were Clear Fork Lake, O'Shaugnessy Reservoir, Guilford Lake, Silver Lake, Crystal Lake, Rex Lake, and Candlewood Lake.

The average water color in the lakes monitored by CLAM volunteers all ranged between two and seven on the Custer color strip (Fig. 1). None of the lakes monitored had average readings of 1 (clear) or 8 to 11 (clays or silt particles).

The trends in the trophic state index (TSI) have been tracked (Fig. 2) for lakes with five years of data or more. Twenty-six out of the 38 have the required amount of data to calculate the trends. Eleven of these lakes show trends in becoming clearer, with only two lakes (Buckeye Lake and Forked Run Lake) having one full TSI unit or greater of change. Four of these lakes have less than half a TSI unit of change toward becoming more clear.

The remaining 15 lakes have trends that indicate they are becoming more turbid. Eight of these lakes (Guilford Lake, Atwood Lake, Indian Lake, Fisherman's Pond, Nettle Lake, Lake Erie, Lakengren, and Lake Loramie) have less than half of a TSI unit of change. Lake Lorelei, Hoover Reservoir, and Leesville Lake have one or more units of change in TSI units.

Discussion

The eutrophic (Secchi depth between 20 and 78 inches) and the hypereutrophic (Secchi depth less than 20 inches) classifications describe lakes that have low water clarity and high levels of aquatic weeds. These lakes types have green water due to algae, no oxygen in the bottom water strata, support warm water fisheries, and will have pollution tolerant invertebrate species found in their sediments.

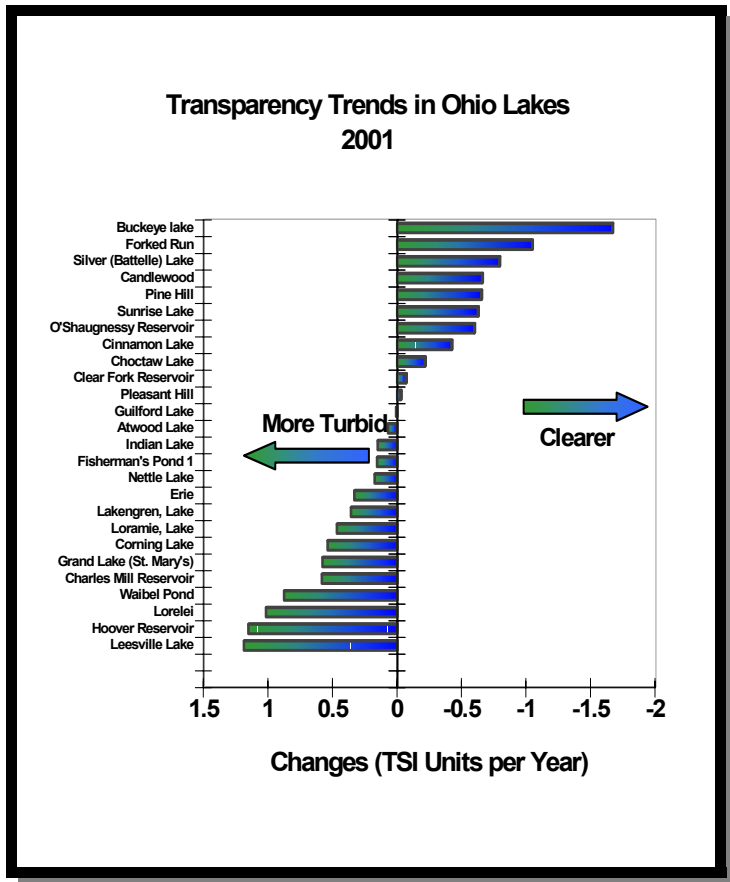


Fig. 2 Change in Trophic State Index (TSI) values per year. A negative change in the TSI value indicates a trend toward a clearer lake, while a positive change in the TSI value indicates a trend toward a more turbid lake.

In the extreme eutrophic cases, heavy algal blooms, dense aquatic weed beds, and a complete loss of oxygen causing fish kills can occur in the waterbody.

Eutrophication, or the enrichment of the water by nutrients such as nitrogen and phosphorus, is the process resulting in these lake trophic states which is enhanced by point or non-point source pollution. A loading to the water column of erosional materials, such as silt and clays, from the adjoining watershed also contributes to eutrophic conditions by reducing the lake depth.

Through the on-going monitoring carried out by **CLAM** volunteers, the data have indicated that the 38 **CLAM** monitored lakes in the 2001 season are 1) with the exception of Lake Buckhorn, eutrophic or hypereutrophic, 2) are probably dominated by algal turbidity, and 3) exhibit changing water transparencies.

Additional information on individual **CLAM** lakes can be found in the Lake Summary Reports. To request a Report, contact:

CLAM Program Manager
Ohio Lake Management Society
P.O. Box 463, Kent, OH 44240
330-672-5475
330-683-9456
smith@olms.org

Include your name, address, phone number, and the **CLAM** lake name of interest.

Lake Buckhorn in Holmes county is classified as mesotrophic. Having transparencies in the 90 inch range marks this lake as rare in the **CLAM** program. These lakes are attributed with fairly clear visibility and having cleaner substrate containing a more pollution in-tolerant macro-invertebrate community. Lakes in this condition should watch for nutrient loadings and encourage best management practices (BMP's) on neighboring land.

Twenty-five of the lakes monitored are classified as eutrophic and twelve as hypereutrophic. These classifications are common in Ohio for lakes that are relatively shallow. This is due to Ohio's rich soils, agricultural practices, land construction, urban encroachment, and heavy land use in the surrounding watersheds.

This classification scheme, with the associated lake conditions, is only valid if the observed transparency is influenced by algae, not dissolved color or suspended sediment. An evaluation of water color provides an indication as to the cause of low water clarity.

All of the **CLAM** monitored lakes exhibited a more green water color, on average, than brown. This suggests that algal biomass, not suspended sediment, dominates the water column in the lakes. Therefore, to classify them as mesotrophic, eutrophic, and hypereutrophic is considered appropriate.

Please contact us at
330-672-5475,
330-683-9456 or
smith@olms.org
if you are interested in
becoming a **CLAM** lake
volunteer monitor.



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Acknowledgements

The Ohio Lake Management Society would like to thank its dedicated **CLAM** volunteers for the many hours that they have given to **CLAM** and the lake in which they serve. Without these individuals, the condition of many Ohio lakes would not be documented. Many of our volunteers have been involved in the program for many years. Twenty-two or 32% of our 69 participants in 2001 had 10+ years of experience in the **CLAM** program. Congratulations to our new inductees to the 10+ and 5 year Club. Having an experienced and diverse volunteer base solidifies the existence of a strong volunteer program. This in turn increases the value of the data collect in the **CLAM** program. Another factor that increases the value of the data collected by our volunteers is how many samples were reported. Thirty-seven volunteers (53%) turned in ten or more data sets for the 2001 season. When volunteers collect more than 10 times in a given season, this allows us to paint a more precise picture the lake and our statistical calculations will have more power to establish conclusions.

Our organization also recognizes the generous assistance given to **CLAM** by our sponsors and supporters. We receive funding through The U.S. Environmental Protection Agency section 319 of the Clean Water Act. **CLAM** is also supported with in-kind contributions from Kent State University, Ohio EPA, Muskingum Watershed Conservancy District, Ohio State University Extension, Hamilton County Park District, Ohio Department of Natural Resources, and the Richland County Soil and Water Conservation District. The collaboration of these groups with OLMS allows watershed education and data collection efforts to continue in Ohio through the **CLAM** program!

The **CLAM** Volunteer Ten Year + Club

Robert Biro *	11 years	Lake Erie, west basin
David Bohla *	11 years	Indian Lake
Mark Hausman *	11 years	Atwood Lake
Clifford Hoenie *	11 years	Indian Lake
James Mueller	11 years	Indian Lake
Richard Seiple	11 years	O'Shaughnessy Reservoir
Bob and Ginny Sundin *	11 years	Pine Hill Lake
John Tholen	11 years	Silver Lake
John Walker *	11 years	Buckeye Lake
Gary Weinheimer	11 years	Fisherman's Pond
Ken Loughman	11 years	Clear Fork Reservoir
Wilber & Vert Molitor	11 years	Indian Lake
John Reinhard *	11 years	Choctaw Lake
George Barhorst *	11 years	Lake Loramie
Dawn Gerlica *	10 years	Fisherman's Pond & Corning Lake
Jonathan Herman *	10 years	Grand Lake St. Mary's
Cheryl Mattevi	10 years	Guilford Lake
Pat McKirnan *	10 years	Grand Lake St. Mary's
James Short *	10 years	Nettle Lake
Charlie Wojcik *	10 years	Lake Lorelei
Robert Waibel *	10 years	Waibel Pond
David Leiter	10 years	Indian Lake

The **CLAM** Volunteer Five Year Club

Deiter Sems	9 years	Leesville Lake
Carl Moore *	9 years	Sunrise Lake
Gale Osborne *	9 years	Forked Run
Donald Green *	8 years	Cinnamon Lake
Kathy Cattrell	7 years	Guilford Lake
William Lewis *	7 years	Indian Lake
Nelson Shogren *	7 years	Charles Mill Reservoir
Paul Adams	7 years	Silver Lake
John Frenk *	6 years	Charles Mill Reservoir
Norman Johnson *	6 years	Pleasant Hill Lake
Christopher J. Studer *	6 years	Pleasant Hill Lake
Philip Clem *	5 years	Indian Lake
Steve James	5 years	Pleasant Hill

Bold Type and * denotes a **Gold Star Volunteer** with ten or more lake monitoring dates reported in 2001. **Blue** represents new inductees.

New **CLAM** Monitors in 2001:

Gary Branstetter	Cesar Creek
Camp Firebird	Leesville Lake
Jennifer Chandler	Lake Katharine
Hobert & Dorothy Coombs	Lake Waynoka
Willard Donoho *	Aurora Lake
Gene Knight	Ceasars Creek
	& Cowan Lake
Kent Kogler *	Lakengren
Jeff Moore	Candlewood Lake
Ben Oswald *	O'Shaughnessy Res.
Larry Sheets *	Lake Buckhorn
Hocking College *	Lake Snowden

*denotes a **Gold Star Volunteer** with ten or more lake monitoring dates reported in 2001. Thank you for your dedication!!



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U.S. Coast Guard Auxiliary at Indian Lake. These dedicated volunteers are also **CLAM** volunteers. They save lives and lakes.